LGL-1-9
347
LEPIDOPTERA
SPRUCE BUDWORM (RESEARCH)
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Reed W. Bailey, Director
FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE

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SURVIVAL OF SPRUCE BUDWORM LARVAE IN UNSEASONAL LOW TEMPERATURES IN MONTANA 1960

Tom T. Terrell, Entomologist

~~Furniss~~ RRD
Buckhorn WJB
Buffam PEB
Carolin VM C
Coulter AKC
~~Guy~~
~~Klein~~ WDK
Mitchell pmm
~~Orr~~ pmm
~~Thomas~~
Wear FW
Wright BBW

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Prepared By The
Missoula Forest Insect Laboratory
Missoula, Montana

SURVIVAL OF SPRUCE BUDWORM LARVAE IN UNSEASONAL LOW TEMPERATURES IN MONTANA 1960

Tom T. Terrell, Entomologist
Division of Forest Insect Research

Some forest insect pests, notably bark beetles, die in appreciable numbers from the effects of unseasonal low temperatures. Because such mortality occurs, it gave rise to the hope that abnormally low temperatures would also decrease overwintering spruce budworm Choristoneura fumiferana (Clem.), populations.

There was no evidence on hand to suggest that hibernating budworm larvae is affected by low temperatures in Montana, but, because most fauna are affected by abnormalities of their environment, budworm larvae might suffer mortality under some circumstances.

In almost every instance where aerial spraying programs are planned, surveys of overwintering budworm larvae are made to assure that infestation still exists in the areas. In all cases where the previous year's survey indicated an infestation from evidence of damage, budworm population was found present in the spring surveys. These surveys are not made primarily because of the expectation of winter caused mortality, they are simply a link tying a survey of foliar damage caused by a past generation of insects to a current budworm population. No study has ever been made in Montana to determine how or to what degree hibernating budworm larvae are affected by abnormal temperatures.

During November 1959 most of Montana suffered an unseasonal cold wave. The period lasted seven days--November 11-17. The coldest area was in the Blackfoot River Valley northeast of Missoula where low temperatures of -45° and -53°F. were recorded.

To check the possible effects this unusual weather may have had on hibernating budworm larvae, a sample of the larvae were collected February 5, 1960 from a permanent budworm survey plot (Blackfoot plot no. 3) in the Blackfoot Valley. Five intermediate Douglas-fir trees were felled and two bole sections or billets were cut from each tree. These bole sections contained the larvae hibernating in the bark crevices. The billets were caged in cartons in a warm room to force early emergence of the larvae.

In 1959 a region-wide survey made on 25 permanent plots gave an average figure of 18 larvae overwintering per square foot of tree bole bark. These larvae resulted from an average of 8 budworm egg masses per 1000 square inches of foliage. Admittedly, there was considerable variance within these data. However, using the same ratio 16.6 budworm egg masses found in 1959 on Blackfoot plot no. 3 should produce about 37 budworm larvae per square foot of bark in the spring of 1960. Larval emergence from the sample exceeded this figure as the following table shows:

Tree	Bark surface sq. ft.	Emerged larvae	Larvae per square foot
1	3.2	141	44.1
2	3.5	125	35.7
3	3.0	92	30.7
4	3.0	56	18.7
5	3.5	261	74.6
	16.2	675	41.7

These data indicate that the unseasonal low temperatures of last November had little effect on the hibernating budworm larvae in the area sampled. These results are felt to be indicative of the conditions elsewhere in Montana, where temperatures were not as low.